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SiO_2溶胶作用下电沉积锌电极性能研究

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Effect of SiO_2 Sol on Performance of Electrodeposited Zinc Electrodes

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摘要 在碱性镀锌液中加入SiO_2溶胶，采用电沉积技术制备电沉积式锌电极，考察镀液中加入SiO_2溶胶对锌电极的电沉积速度、微观形貌及电化学性能的影响规律。研究结果表明：随着镀液中SiO_2溶胶浓度（0～200 mL/L）的增加，锌的电沉积速度逐渐下降；溶胶作用下得到的锌电极的微观表面较平整致密，没有出现较大孔洞，且耐腐蚀性和循环可逆性得到改善；尤其是溶胶浓度为150 mL/L时，锌电极具有最小的腐蚀电流密度，且阴、阳极峰值电位差较小，锌电极的电化学性能最好。

关键词： 碱性镀液 SiO_2溶胶 锌 电极 表面形貌 沉积速度 电化学性能

Abstract: Zinc electrodes are prepared in an alkaline electrolyte containing SiO_2 sol by electrodeposition in order to investigate the influence of SiO_2 sol on the deposition rate, micrograph, and electrochemical performance of the zinc electrodes. The results show that deposition rate gradually decreases as the concentration of SiO_2 sol (0- 200 mL/L) increases, and that the surface morphology of zinc electrodes is more compact and even without large pores. Besides, the corrosion resistance and cycle reversibility of zinc electrodes are improved by adding SiO_2 sol in the electrolyte. When the concentration of SiO_2 sol is 150 mL/L, the lowest corrosion current density and relatively lower differential value between the anodic and cathodic peak potentials of zinc electrodes are achieved, which exhibits the best electrochemical performance.

Keywords: alkaline electrolyte SiO_2 sol zinc electrodes surface morphology deposition rate electrochemical performance

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